REMARKS

Claims 1-15 are pending in the application, of which claims 1-15 presently stand rejected. In view of the remarks that follow, allowance of the application is respectfully requested.

Claim Rejections – 35 U.S.C. § 103(a)

1. The Examiner has rejected claims 1-14 under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,689,270 by *Kelley et al* in view of PCT international application no. WO009711384A1, to *Duffett-Smith et al*. Applicants respectfully traverse this rejection.

The recitations of the independent **claims 1, 2, 8** and **9** are exemplified at page 8, line 13 through page 9, line 7 of the published application WO 00/73813. As explained on page 1, line 31 through page 3, line 27 in the background section of WO 00/73813, prior positioning systems employing unsynchronized transmitters used signals from transmitters (e.g., Base Transceiver Stations or BTSs) received at both a mobile handset and a Location Measurement Unit (LMU) of known location, representations of which were sent to a Mobile Location Center (MLC) for comparison and determination of their time differences to resolve the position of the handset. As explained on page 4, lines 12-25 in the background section of WO 00/73813, measurements were needed from two or more LMUs which act as reference points at which the unsynchronized signals radiated by the BTSs are measured for comparison with the same signals received by the handset. This is because, in practice, it was difficult to find a match using one LMU since the handset may receive signals from BTSs that were not received by the LMU and *vice-versa*. As explained at page 4, line 26 through page 5, line 20 in the background section of WO 00/73813, disadvantageous and unknown clock time offsets introduced by the use of additional LMUs were overcome by creating a synchronized LMU network with a LMU synchronization map. The present invention provides yet another means for obtaining the benefits of an effectively synchronized LMU network by setting up one or more virtual LMUs.

The virtual LMU (VLMU), in accordance with an exemplary embodiment of the recited invention, calculates and maintains a list of offsets in time, phase, frequency, or derivatives thereof, of signals received from a plurality of transmission sources (e.g., BTSs), received at a given location (which may be anywhere, and does not need to be the physical location of a real LMU or a handset; the centre of the Earth is commonly used), relative to a common reference. In other words, the list of offsets relative to the common reference is a combined list of generated timings that is equivalent to that which would have been observed by a single (real) LMU at the VLMU location and making timing measurements of every BTS in the network. Thus, common reference recited in the independent claims 1, 2, 8 and 9 is different from the reference source in each receiver also recited in the independent claims 1, 2, 8 and 9.

The Examiner has apparently relied on *Kelley et al* to purportedly teach item (b) of claim 1 and admits that *Kelley et al* does not teach item (a) of claim 1. The Examiner relies instead on *Duffett-Smith et al* to teach item (a) of claim 1 and overcome the deficiencies of *Kelley et al*. Similar rejections apply to independent claims 2, 8 and 9.

Applicants respectfully submit that *Kelley et al* and *Duffett-Smith et al* neither singly nor in combination teach or suggest the invention recited in claims 1, 2, 8 and 9. In particular, neither *Kelley et al* nor *Duffett-Smith et al* singly or in combination teaches or suggests at least the item (b) recited in claim 1, or similar recitation in independent claims 2, 8 and 9.

The system described in *Kelley et al* operates in a scenario in which there are multiple transmitters, multiple individual mobile units 432, and a single fixed position observer (i.e., a fixed observer unit or FOU 430). Basically, the FOU 430 and the mobile unit 432 receive signals from each of the transmitters, and the FOU 430 transmits phase measurements to the mobile unit so that the respective signals from a transmitter to (1) the FOU 430 and (2) the mobile unit 432 can be compared in order to find the position of the mobile unit.

The present invention, however, has plural mobile units, plural transmitters and a given (arbitrary) location (e.g., the location of an above-described VLMU) for which a list of offsets is generated by steps (a) and (b) of claim 1 and similar steps or apparatus functions in claims 2, 8 and 9. In accordance an exemplary embodiment of the claimed invention, this list of offsets for the given location (e.g., VLMU) is generated by acquiring data from each of the mobile receivers

or LMUs and then combining the acquired data. *Kelley et al*, on the other hand, has no reference to combining data from plural receivers to create a list, let alone a list of offsets at a given location relative to a common reference. Each FOU 430 in *Kelley et al* is also completely independent (when there is more than one), and the FOU received signals are not combined in any way. Furthermore, each FOU in *Kelley et al* is at a fixed location. By contrast, in the present invention, the positions of the receivers may be known but certainly do not need to be. Their positions, in fact, are calculated as a by-product of generating the list (e.g. by solving the set of non-linear equations set out in WO/73813 at equations 10-14), or they can be positionally determined by subsequent use of the list.

In this regard, Applicants respectfully submit that the present invention does not need fixed reference receivers at known locations, and that the receivers are preferably mobile units at unknown locations. It is this data, which is combined into the recited list that is global to plural receivers, that can then be used for positioning information for mobile receivers in the system. Thus, *Kelley et al* does not teach or suggest the invention as recited in the independent claims 1, 2, 8 and 9 nor their preambles. *Kelley et al* does not acquire data from plural receivers relative to a reference source in each receiver or to each other, and it certainly does not combine the acquired data to calculate the list of offsets at the given location relative to the common reference.

Duffett-Smith et al discloses a system and method whereby a fixed base station and a mobile receiver receive signals from two or more transmitters (e.g., BTSs), and information about the received signals is passed from the fixed station and the mobile receiver to a position determining processor for comparison purposes to determine the location of the mobile receiver. *Duffett-Smith et al* does not describe a system or method that produces a list as recited in the independent claims 1, 2, 8 and 9; rather, *Duffett-Smith et al* arguably creates plural lists of received signal offsets. In other words, each receiver creates a list of offsets of the signals received from the specific transmitters (e.g., BTSs) from which it was able to decode the transmitted signals. Since each receiver is at a different location, each of the receivers' lists contains offset values in respect of the signals from different sets of the transmitters. None of the receivers can receive signals from all of the transmitters due to their different locations. Thus,

Duffett-Smith et al merely teaches generating a set of individual lists or received signal time offsets at different receivers. The claimed invention, by contrast, calculates a list of time offsets from plural receivers relative to a common reference (e.g., as stated above, a real, hypothetical or virtual receiver at a chosen or given location). In other words, the recited list of time offsets provides location information as if the entire network had been observed by one receiver.

In addition, the offset referred to in *Duffett-Smith et al* is the offset of a known point in the signals received at the fixed base station and roving receiver (e.g., handset) and not transmission time offsets as recited in item (a) in claim 1 and similar recitation in claims 2, 8 and 9 (e.g., offsets of signals from plural transmission sources (e.g., BTSs) at each of plural receivers.

The advantages of the present invention are (1) the ability to avoid the need to fix multiple receivers in known positions; (2) the fact that different mobile receivers get significantly different signals such that the data relating to which is therefore more useful of the overall system; and (3) the fact that, since no mobile receiver can receive signals from all transmitters in the system, the use of a generated list which can be used across the system as a whole avoids the need for additional redundancy. The latter point is critical to an effective real system.

Because *Kelley et al* and *Duffett-Smith et al* both fail to teach or suggest at least item (b) in claim 1 and similar recitation in claims 2, 8 and 9 and claims 3-7 and 10-14 depend from one of these base claims, withdrawal of this basis for rejecting claims 1-14 is believed to be proper and is respectfully requested.

2. The Examiner has rejected claim 15 under 35 U.S.C. § 103(a) as unpatentable over *Kelley et al* and *Duffett-Smith et al* in view of U.S. Patent No. 6,108,315 to *Freeburg et al*. Applicants traverse this rejection.

As to the rejection of **claim 15**:

Claim 15 depends from independent claim 8 or 9. As discussed above, *Kelley et al* and *Duffett-Smith et al* do not teach or suggest the invention recited in claim 8 or 9. *Freeburg et al*

does not overcome the deficiencies of *Kelley et al.* Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejection of claim 15 is respectfully requested.

Conclusion

In view of the amendments and arguments set forth above, Applicants submit that the present application is in condition for allowance and would appreciate early notification of the same.

Invitation for a telephone interview

The Examiner is invited to call the undersigned at (202) 659-9076 if further issues remain with allowance of this case.

Deposit Account Authorization

Although no fee is believed due by submission of this paper, authorization is hereby made to charge any fees due or outstanding, or credit any overpayment, to Deposit Account No. **18-2220** (Order No. 41253).

Respectfully Submitted,

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